

# The Relationship between Joint Spacing and Distresses Present

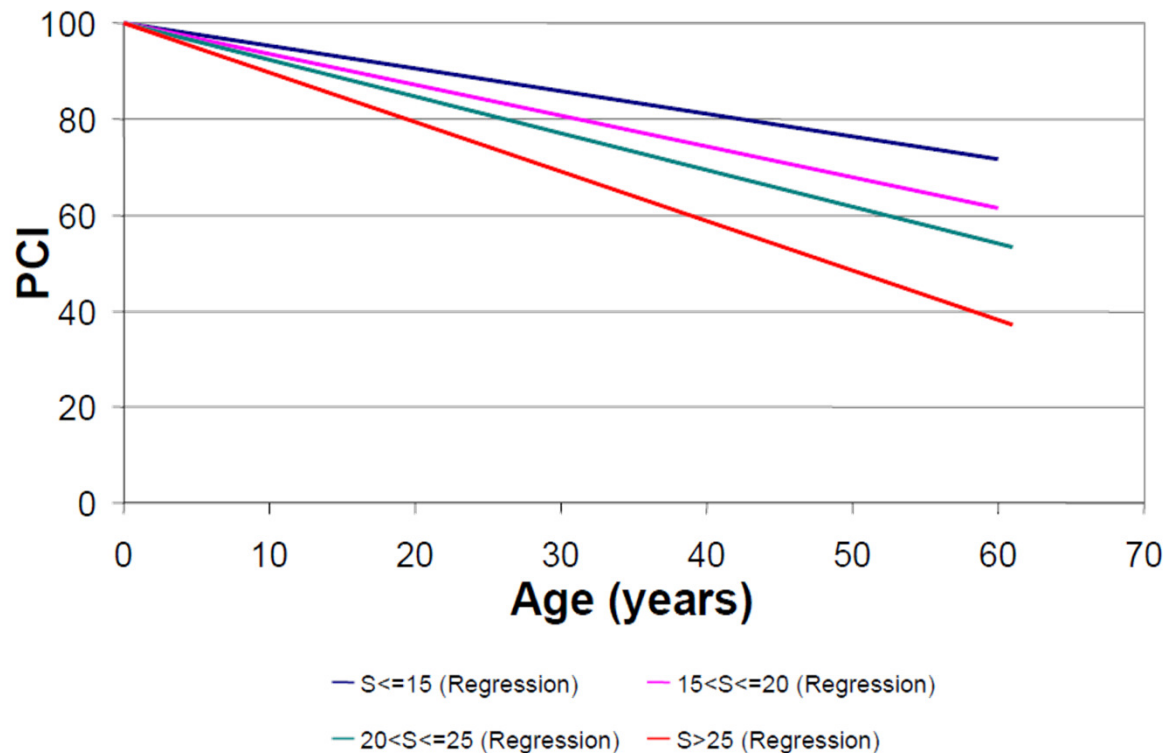
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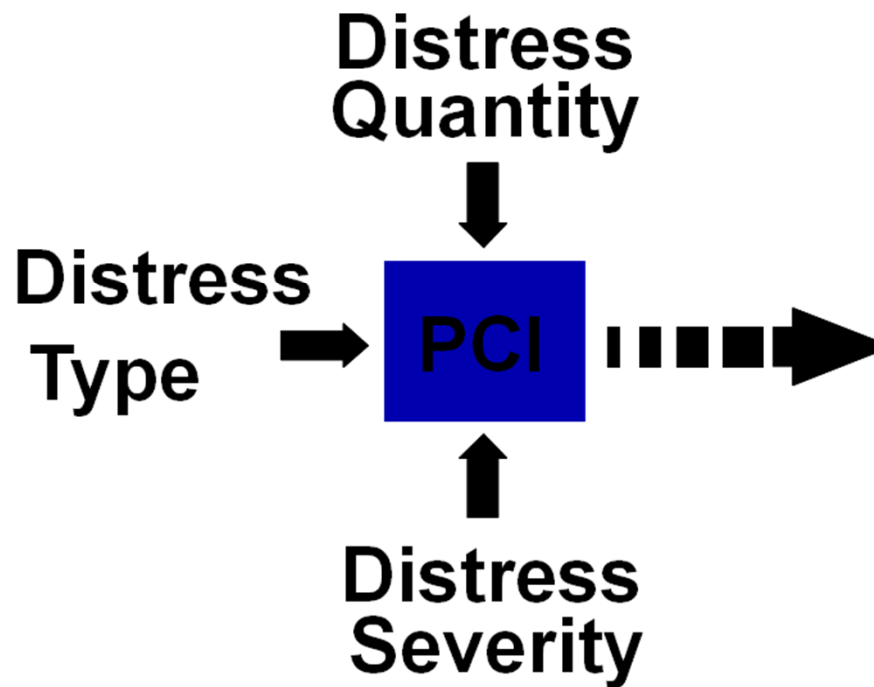
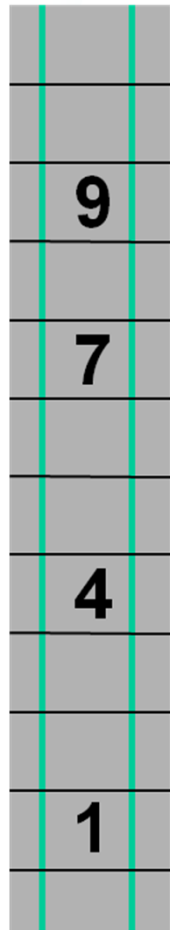
# Introduction

- Previous research indicates smaller joint spacings cause PCC pavements to perform better and have lower life cycle costs.



# Why?

Sample Units



PAVEMENT CONDITION INDEX (PCI)	COLOR CODE	RATING
100-86	Green	GOOD
85-71	Light Green	SATISFACTORY
70-56	Yellow	FAIR
55-41	Pink	POOR
40-26	Red	VERY POOR
25-11	Dark Red	SERIOUS
10-0	Gray	FAILED
		NOT SURVEYED

# Objective

- This study attempted to determine the mechanism by which smaller slabs perform better
  - Fewer distresses?
  - Fewer high-deduct distresses?
  - Lower severities?

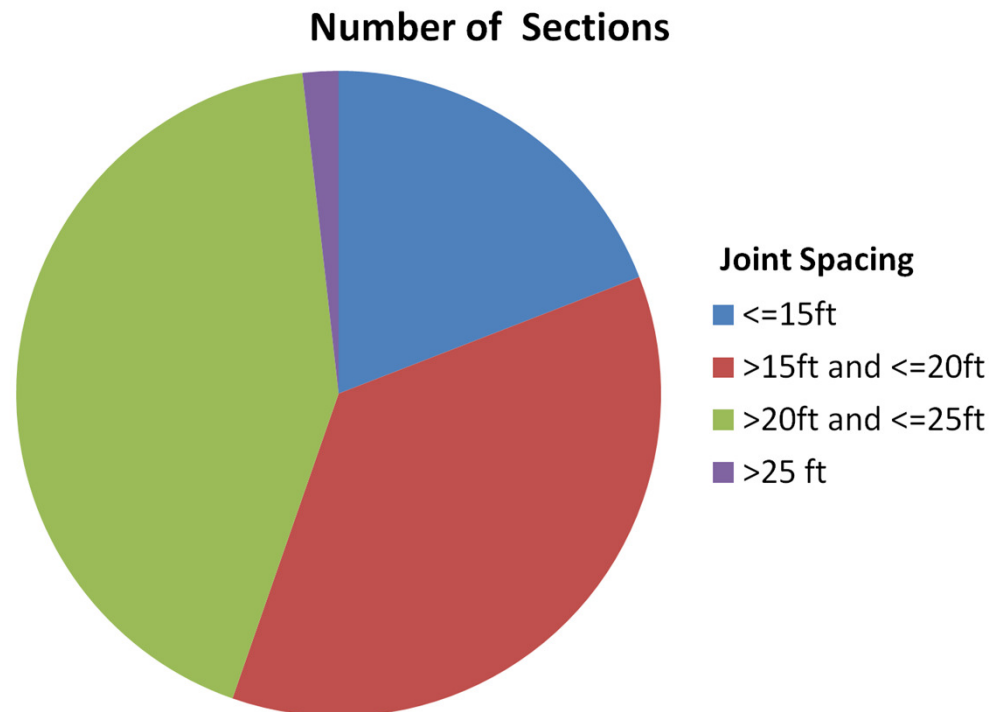


# Research Approach

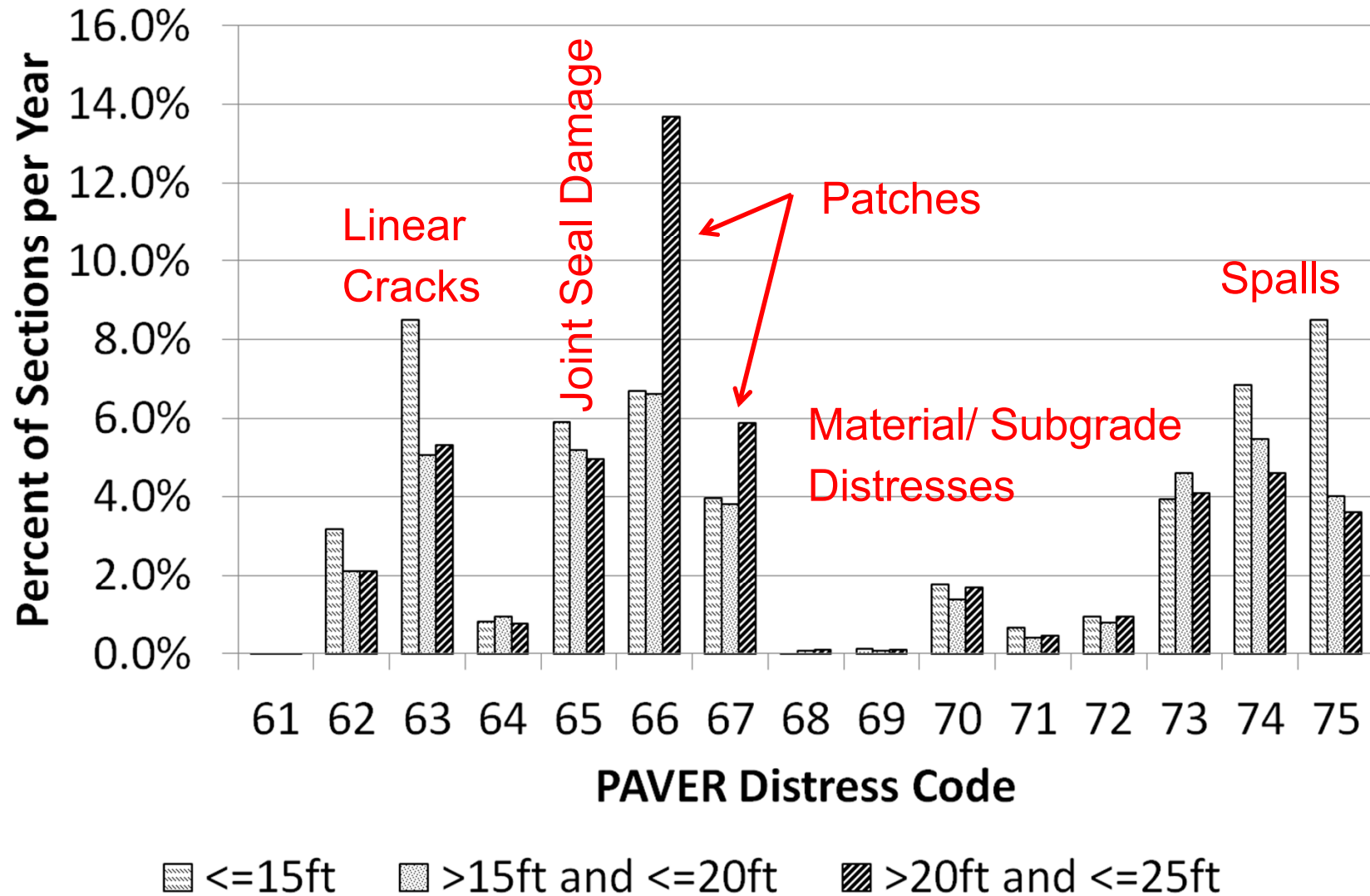
- Data for 7,800 PCI-inspected pavement sections obtained from USAF
- Categorize sections by joint spacing
- Determine which distresses were present
- Calculate rates of distress occurrence
- Calculate typical distress density
- Determine most common distress severity levels

# Data

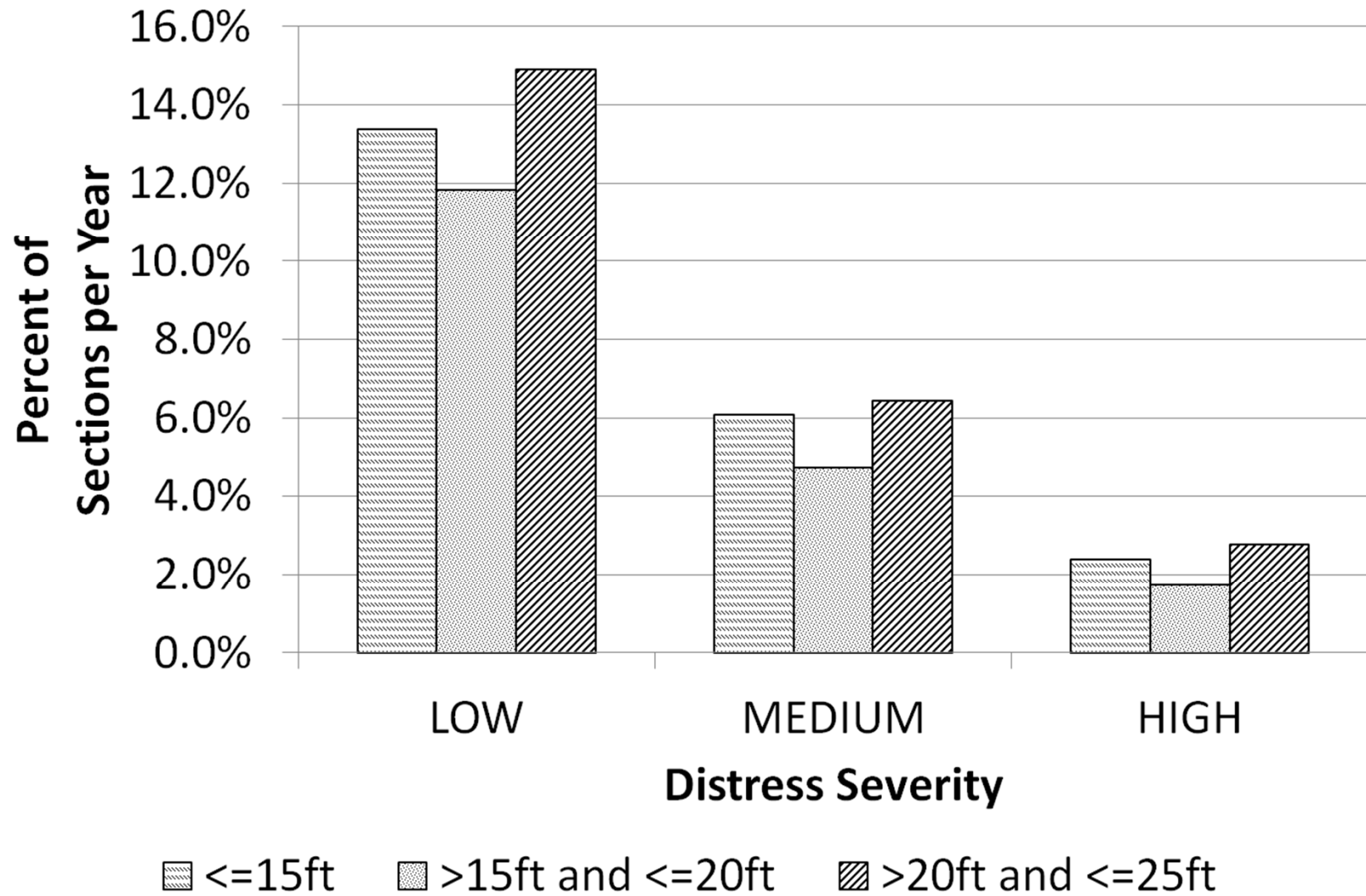
- Database expanded from previous research
- Divided into same 4 slab size categories
- Slabs larger than 25ft not included in analysis due to small sample size



## NORMALIZED OCCURRENCE BY DISTRESS

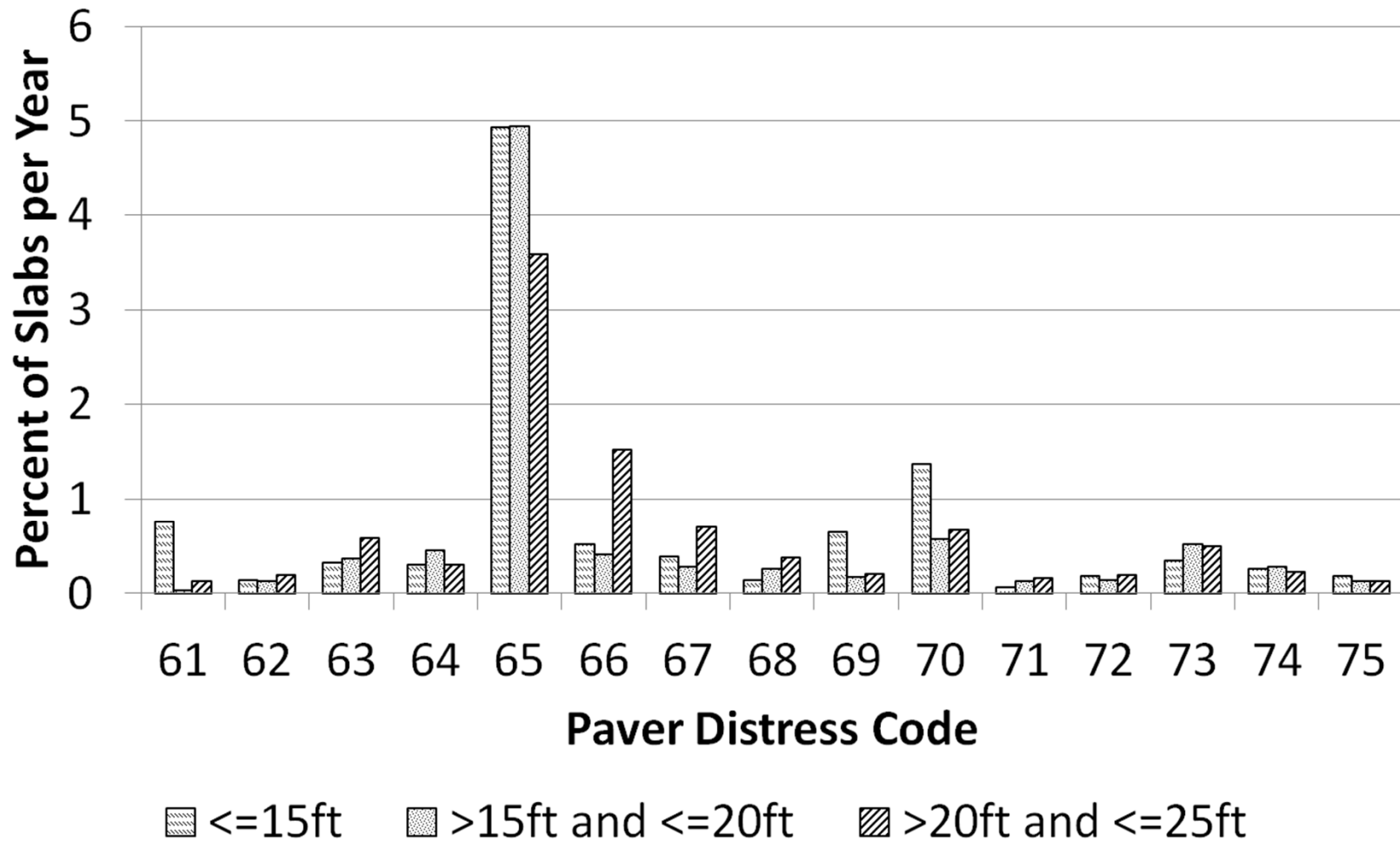


## NORMALIZED OCCURRENCE BY SEVERITY

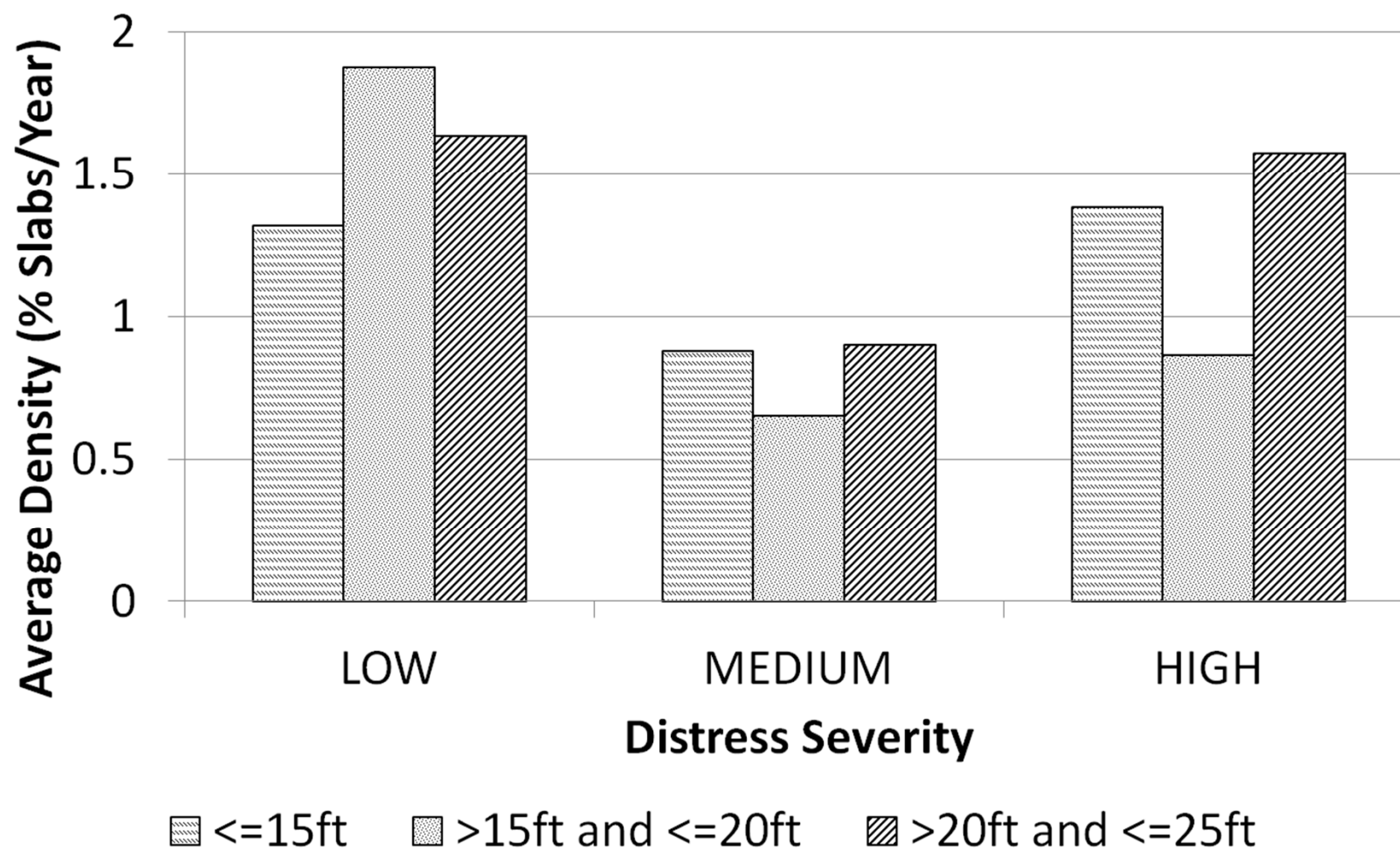




## AVERAGE NORMALIZED DISTRESS DENSITY BY DISTRESS



## AVERAGE NORMALIZED DISTRESS DENSITY BY SEVERITY



# Deduct Values-Patching

Small

Joint Spacing (ft)	Severity			Total
	Low	Medium	High	
$s \leq 15$	0.0068	0.0018	0.0002	0.0089
$15 < s \leq 20$	0.0048	0.0014	0.0003	0.0065
$20 < s \leq 25$	0.0340	0.0034	0.0003	0.0378

Large

Joint Spacing (ft)	Severity			Total
	Low	Medium	High	
$s \leq 15$	0.0115	0.0035	0.0008	0.0158
$15 < s \leq 20$	0.0074	0.0028	0.0010	0.0112
$20 < s \leq 25$	0.0224	0.0285	0.0011	0.0520

# Deduct Values-Joint Spalling

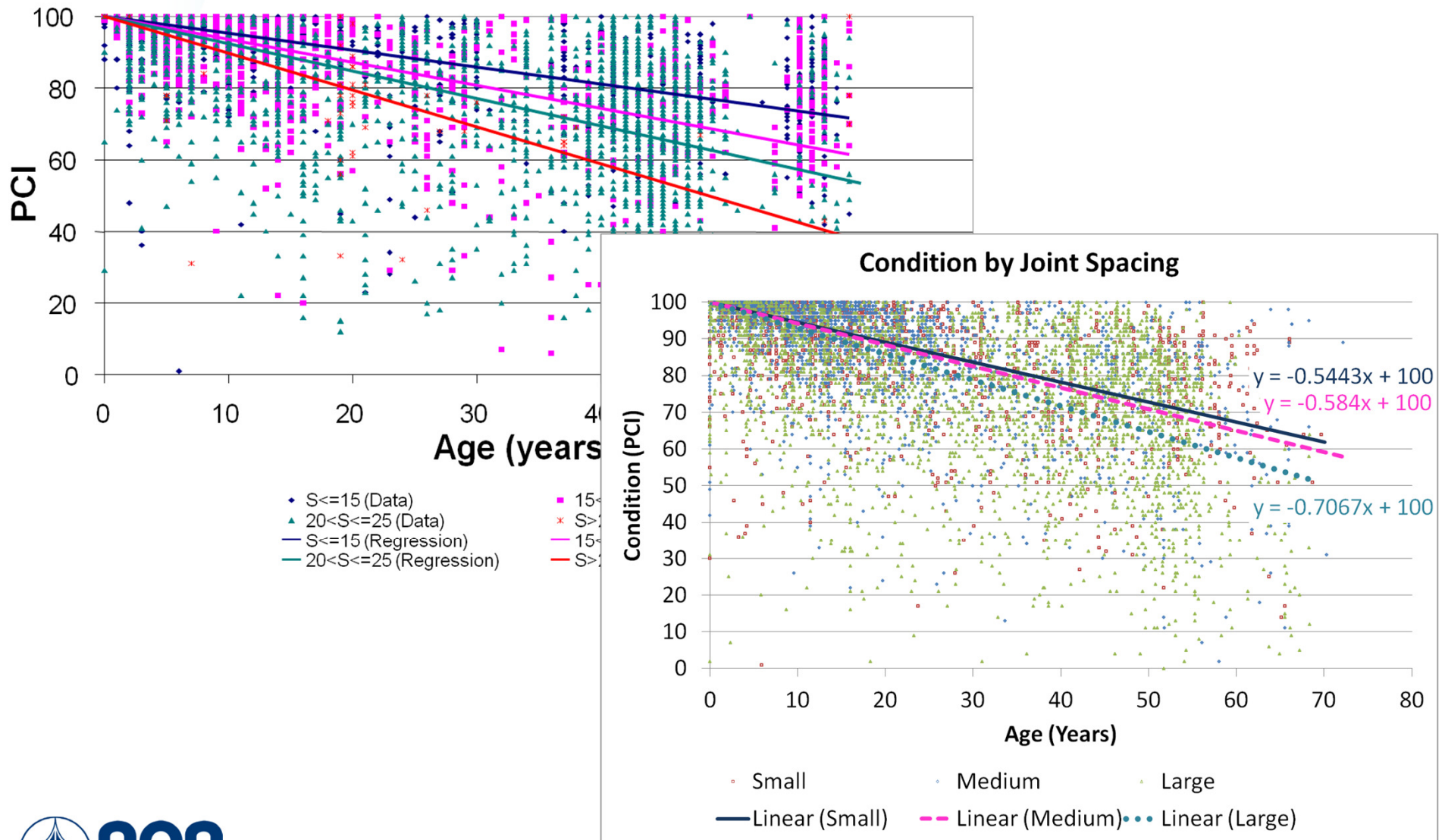
## Joint

Joint Spacing (ft)	Severity			Total
	Low	Medium	High	
$s \leq 15$	0.0052	0.0032	0.0019	0.0103
$15 < s \leq 20$	0.0046	0.0018	0.0009	0.0073
$20 < s \leq 25$	0.0031	0.0021	0.0015	0.0066

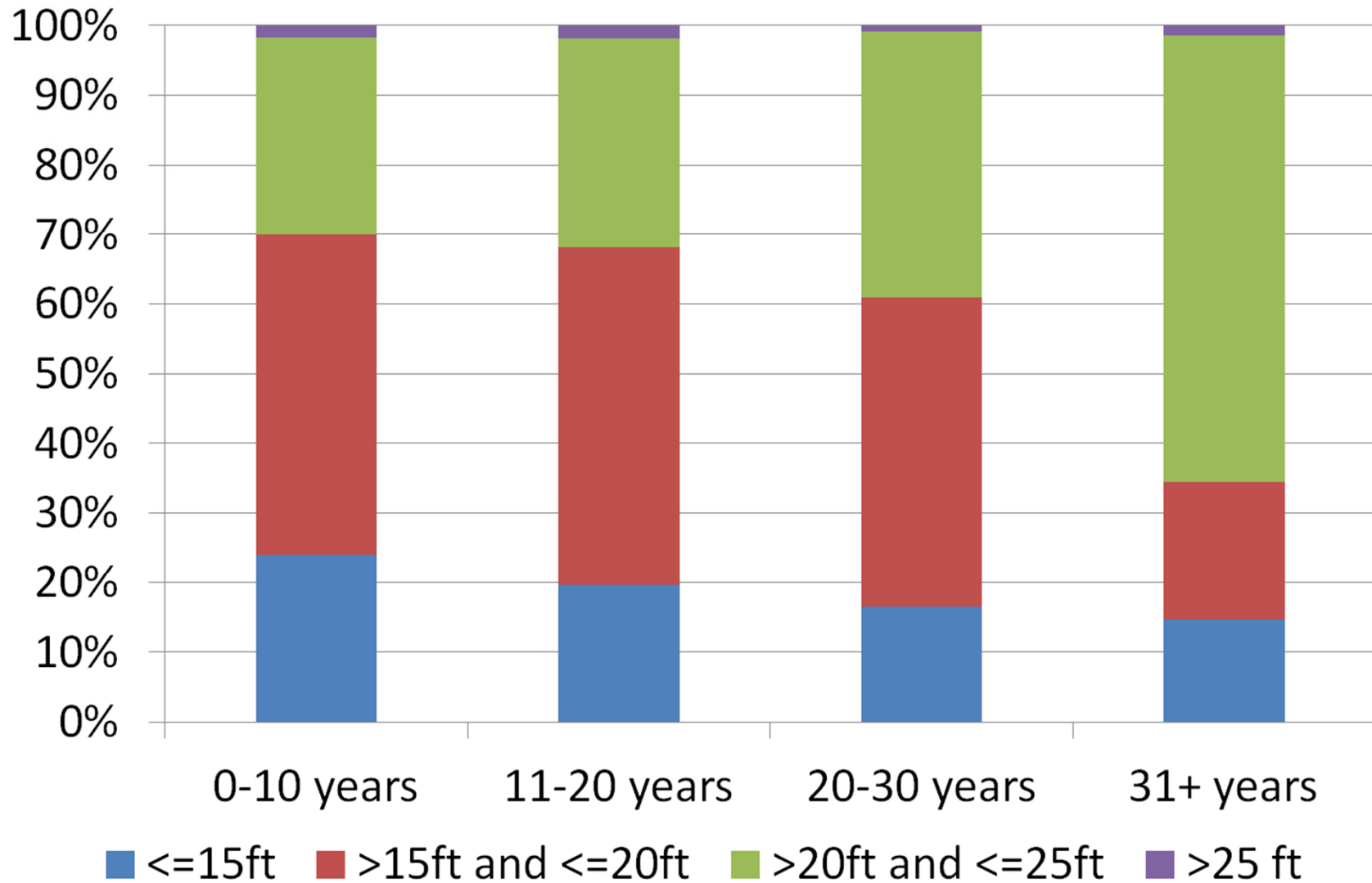
## Corner

Joint Spacing (ft)	Severity			Total
	Low	Medium	High	
$s \leq 15$	0.0063	0.0016	0.0004	0.0083
$15 < s \leq 20$	0.0017	0.0007	0.0004	0.0027
$20 < s \leq 25$	0.0013	0.0008	0.0003	0.0024

# Compare to Previous Findings



## Joint Spacing Distribution by Age





# Conclusions

- The overall trend of smaller joint spacing performing better is supported by this data set
- The mechanics of why smaller slabs perform better were not identified
  - Distresses do not appear to occur at higher rates on larger slabs
  - Distresses do not appear to be more severe on larger slabs
  - High-deduct distresses do not appear to occur at higher rates on larger slabs
- The possibility of a correlation with date of construction (not age at inspection) should be investigated